

Mumbai University

QUESTION PAPER

April – 2014

[B.Sc.IT – SEMESTER: VI]
(CBSGS – 60:40 PATTERN)

- ❖ INTERNET TECHNOLOGIES
- ❖ DIGITAL SIGNALS AND SYSTEMS
- ❖ DATA WAREHOUSING
- ❖ IPR AND CYBER LAWS
- ❖ PROJECT MANAGEMENT
- ❖ GEOGRAPHIC INFORMATION SYSTEMS

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Question Paper

**[CBSGS – 60:40 PATTERN]
(APRIL – 2014)**

PAPER - I

**INTERNET
TECHNOLOGIES**

Time: 2 ½ Hours**Total Marks:** 60**N.B.:** (1) All Question are Compulsory.

(2) Make Suitable Assumptions Wherever Necessary And State The Assumptions Made.

(3) Answer To The Same Question Must Be Written Together.

(4) Number To The Right Indicates Marks.

(5) Draw Neat Labeled Diagrams Wherever Necessary.

(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Compare IPV4 with IPV6. (5)
- (B) Describe the concept of Subnetting & Supernetting in IPV4 Class Full Addressing Technique. (5)
- (C) Draw & explain a neat labelled diagram of IPV4 datagram Header Format. (5)
- (D) Explain Dual Stack & Tunneling in IPV6. (5)

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Describe 3 phases of Communication between Remote Host & Mobiles Host. (5)
- (B) What are the types of OSPF Packets? What is the purpose of each one? (5)
- (C) Short note on ARP. (5)
- (D) Describe the problem of Counting Infinity or Instability in RIP Distance Vector Routing. (5)

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain TCP Connection Termination by 3 Way Handshaking concept. (5)
- (B) What are the types of TCP Timers? Explain the purpose of each one. (5)
- (C) What are the services of UDP? (5)
- (D) What is Silly Window Syndrome? Explain the Syndrome created by the Sender and the Receiver. (5)

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain SCTP association establishment. (5)
- (B) What is Domain? What are the types of Domains in DNS? Explain. (5)
- (C) What is a resolution in DNS? Explain. (5)
- (D) Describe the DHCP Client-Server Operations in the same & Different Network. (5)

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Describe NVT character set for Option Negotiation. (5)
- (B) What is the concept of Out-Of-Band Signaling? (5)
- (C) Explain the Architecture of WWW. (5)
- (D) List & explain the types of FTP Commands. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain Video Compression using JPEG. (5)
- (B) Describe Leaky Bucket Algorithm of Traffic Shaping. (5)
- (C) Write a short note on MIME. (5)
- (D) What are the services of Internet Audio & Video Communication? Explain the digitization process of Video Data. (5)

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**[CBSGS – 60:40 PATTERN]
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PAPER - II

DIGITAL

SIGNALS AND SYSTEMS

Time: 2 ½ Hours

Total Marks: 60

N.B.: (1) All Question are Compulsory.

(2) Make Suitable Assumptions Wherever Necessary And State The Assumptions Made.

(3) Answer To The Same Question Must Be Written Together.

(4) Number To The Right Indicates Marks.

(5) Draw Neat Labeled Diagrams Wherever Necessary.

(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain in detail the various types of systems. (5)

(B) Check whether the given is Power Signal or Energy Signal and find its value (5)

$$x[n] = 3(-1)^n, n \geq 0$$

$$= 0, n < 0$$

(C) Explain in detail with suitable examples the various properties of Fourier Transform. (5)

(D) Find the Fourier Transform of the Time Function (5)

$$f(t) = 5[u(t+3) + u(t+2) - u(t-2) - u(t-3)]$$

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Find Inverse Laplace Transform of (5)

$$(i) F_1(S) = \frac{S^2+5}{S^3+2S^2+4S}$$

$$(ii) F_2(S) = \frac{3e^{-\frac{S}{3}}}{S^2(S^2+2)}$$

(B) A sinusoidal voltage $25\sin t$ is applied at the instant $t = 0$ to a series RL Circuit with $R = 5\Omega$ and $L = 1 H$. Determine $i(t)$ by using Laplace Transform method. (5)(C) The unit step of a network is $(1 - e^{-n})$. Determine the Impulse Response $h(t)$ of the network. (5)

(D) Find the Laplace Transform of (5)

$$(i) e^{-t}$$

$$(ii) e^{10t}$$

$$(iii) 2 - 2e^t + 0.5 \sin 4t$$

$$(iv) e^{-t} \sin 4t$$

$$(v) e^{2t} + 2te^{-2t} - t^2$$

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

(A) Explain the following properties of z-transform: (5)

(i) Time-reversal

(ii) Time Shifting

(iii) Time Scaling

(iv) Differentiation

(v) Convolution

(B) Determine the causal sequence $x(n)$ for $X(z)$ given by $X(z) = \frac{1+2z^{-1}}{1-2z^{-1}+4z^{-2}}$ (5)(C) Determine the causal signal having z-transform $X(z) = \frac{z^2+z}{(z-\frac{1}{2})^3(z-\frac{1}{4})}$ for the region of convergence (5)

$$|Z| > \frac{1}{2}$$

(D) For n low pass RC network, $R = 1 M\Omega$ and $C = 1\mu l$. Determine the output response for n in the range (5) $C \leq n \leq 3$ when input has a step response of magnitude 2 V and the sampling frequency $f_1 = 50 Hz$.

[TURN OVER]

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain the following properties of a Digital Signal Processing System: (5)
- (i) Linearity
 - (ii) Time-Invariance
 - (iii) Causality
 - (iv) Stability
 - (v) Bounded Input Bounded Output Stability
- (B) Consider a causal and stable LTI system whose input $x(n]$ and output $y(n]$ are related through the second order difference equation $y(n) - \frac{1}{12}y(n-1) - \frac{1}{12}y(n-2) = x(n]$ (5)
- (C) Determine the impulse response for the systems given by the following difference equations: (5)
- (i) $y(n) + 3y(n-1) + 2y(n-2) = 2x(n) - x(n-1)$
 - (ii) $y(n) = x(n) + 3x(n-1) - 4x(n-2) + 2x(n-3)$
- (D) Compute the response of the system $y(n) = 0.7y(n-1) - 0.12y(n-2) + x(n-1) + x(n-2)$ (5) to the input $x(n) = ny(n]$.

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Find the Circular Periodic Convolution using DFT and IDFT of the two sequences: (5)
- $x(n) = \{1, 1, 2, 2\}$ and $h(n) = \{1, 2, 3, 4\}$
- (B) Compute the Circular Periodic Convolution Graphically of the two sequences: (5)
- $x(n) = \delta(n) + \delta(n-1) - \delta(n-2) - \delta(n-3)$ and $h(n) = \delta(n) - \delta(n-2) + \delta(n-4)$
- (C) Given $x(n) = \{1, 2, 3, 4, 5, 6, 7, 8\}$. Find DFT and IDFT using FFT Algorithm. (5)
- (D) An FIR Digital Filter has the unit Impulse Response Sequence, $h(n) = \{2, 2, 1\}$. Determine the output sequence in response to the Input Sequence $x(n) = \{3, 0, -2, 0, 2, 1, 0, -2, -1, 0\}$ using the overlap-add convolution Method. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) A low pass filter has the desired response as given below (5)

$$H_e(e^{j\omega}) = e^{-j3\omega} \quad 0 \leq \omega \leq \frac{\pi}{2}$$

$$= 0 \quad \frac{\pi}{2} \leq \omega \leq \pi$$

Determine the filter coefficient $h(n)$ for $M = 7$, using Type-I frequency sampling technique.

- (B) Determine the unit sample response of the Ideal Low Pass Filter? Why is it not realizable? (5)
- (C) Design a High-Pass Digital FIR filter using Kaiser windows satisfying the specification given below. (5)
- Passband cut-off frequency, $f_p = 3200\text{Hz}$, stopband cut-off frequency, $f_a = 1600\text{Hz}$, passband ripple, $A_p = 0.1\text{dB}$, stopband attenuation, $A_s = 40\text{dB}$ and sampling frequency, $F = 10000\text{Hz}$.
- (D) An analog filter has the following system function. Convert this filter into a digital filter using backward difference for the derivative. $H(S) = \frac{1}{(S+0.1)^2 + 9}$ (5)

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**[CBSGS – 60:40 PATTERN]
(APRIL – 2014)**

PAPER - III

DATA

WAREHOUSING

Time: 2 ½ Hours**Total Marks:** 60**N.B.:** (1) All Question are Compulsory.

(2) Make Suitable Assumptions Wherever Necessary And State The Assumptions Made.

(3) Answer To The Same Question Must Be Written Together.

(4) Number To The Right Indicates Marks.

(5) Draw Neat Labeled Diagrams Wherever Necessary.

(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is Data Warehouse? List and explain the characteristics of the data warehouse. (5)
- (B) Explain the additive, Semi-Additive and Non-Additive Measures with examples. (5)
- (C) What are the various levels of Data Redundancy in the Data Warehouse? (5)
- (D) Differentiate between Operational System and Informational System. (5)

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is Listener? Write a procedure to create a listener. (5)
- (B) Explain the procedure for defining source metadata manually with Data Object Editor. (5)
- (C) Write a procedure to create a new project in OWB. What is the difference between a module and a Project? (5)
- (D) Draw and explain OWB Architecture with suitable diagram. (5)

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Write a short note on Cube and Dimensions. (5)
- (B) Explain the steps for importing the Metadata for a flat file. (5)
- (C) What is a Module? Explain Source Module and Target Module. (5)
- (D) List and explain the functionalities that can be performed by OWB in order to create a Data Warehouse. (5)

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is the Staging Area? What are advantages and disadvantages of Staging? (5)
- (B) List and explain the use of various Windows available in Mapping Editor. (5)
- (C) Explain the various OWB Operators. (5)
- (D) Write the steps for Building Staging Area table using Data Object Editor. (5)

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Write the steps to Add Primary Key for columns of a table in Data Object Editor with suitable example. (5)
- (B) Write a short note on Control Center Manager. (5)
- (C) Write the steps for validating and generating in Data Object Editor. (5)
- (D) Write a short note on ETL Transformation. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain Multi-Dimensional Online Analytical Processing (MOLAP). (5)
- (B) Write a short note on: (5)
 - (i) Metadata Snapshots
 - (ii) The Import Metadata Wizard
- (C) Explain Multidimensional Database Architecture with suitable diagram. (5)
- (D) Explain OLAP Terminologies. (5)

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**[CBSGS – 60:40 PATTERN]
(APRIL – 2014)**

PAPER - IV

ELECTIVE

**IPR AND
CYBER LAWS**

Time: 2 ½ Hours**Total Marks:** 60**N.B.:** (1) All Question are Compulsory.

(2) Make Suitable Assumptions Wherever Necessary And State The Assumptions Made.

(3) Answer To The Same Question Must Be Written Together.

(4) Number To The Right Indicates Marks.

(5) Draw Neat Labeled Diagrams Wherever Necessary.

(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is Unfair Competition? How to protect from it? (5)
- (B) Explain the concept of Intellectual Property Rights. (5)
- (C) List out the basic principles of Design Rights. (5)
- (D) Explain the method of drafting Patent specification. (5)

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain the concept of Semi-Conductors. State and explain Semiconductor IC layout design act. (5)
- (B) List out seven US safe Harbour principles. (5)
- (C) Explain computer software as Intellectual Property and its protection. (5)
- (D) Illustrate defences with respect to computer software as intellectual Property. (5)

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) How the rights of a patentee are enforced? What are the duties of a patentee? (5)
- (B) What are different kinds of assignments? Explain briefly. (5)
- (C) Explain "Protecting good will through Copyrights". (5)
- (D) What are essential factors for infringement of Trademark? (5)

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What are general obligations for enforcement of Intellectual Property Rights? Explain. (5)
- (B) Write a short note on Technology Licensing. (5)
- (C) List out Criminal remedies in enforcing intellectual property rights. (5)
- (D) Write a short note on Border Security Measures. (5)

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What are the different roles of Certifying Authorities? Explain. (5)
- (B) What is a Cyber Crime? Brief different Cybercrimes? (5)
- (C) Explain the term Privacy. What are the privacy issues for Data and Software? (5)
- (D) Explain the scope of Cyber Laws. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What are the duties of the subscriber of Digital Signature Certificate? (5)
- (B) What is Cyber Appellate Tribunal? What are its powers? (5)
- (C) What does chapter 5 of IT Act, 2000, "Secure Electronic Records and Secure Digital Signatures" specify? (5)
- (D) What does chapter 4 of IT Act, 2000, "Attribution, Acknowledgement and Dispatch of Electronic Records" cover? (5)

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**[CBSGS – 60:40 PATTERN]
(APRIL – 2014)**

PAPER - IV

ELECTIVE

**PROJECT
MANAGEMENT**

Time: 2 ½ Hours**Total Marks:** 60**N.B.:** (1) All Question are Compulsory.

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(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain “Royce’s Analysis” towards Waterfall Model. (5)
- (B) What are the factors that can be abstracted with Software Economics? Explain in detail. (5)
- (C) How can the team effectiveness be improved? Explain. (5)
- (D) Write a short note on “Function Points”. (5)

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Enlist any ten principles of Conventional Process. (5)
- (B) Explain the significance of Vision Document. (5)
- (C) Write a short note on Management Perspective Architecture. (5)
- (D) Explain the different Lifecycle Phases in detail. (5)

Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain Interaction Workflows. (5)
- (B) “In order to ensure the consistency on various Artifacts, the Major Milestones Concentrate on Objective, Operational Capabilities, & Release Issues”. Explain this statement. (5)
- (C) Explain different levels of evolutionary work Breakdown Structure. (5)
- (D) Enlist the top seven workflows and explain any four of them in detail. (5)

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain about “Line-of-business” Organization. (5)
- (B) Explain the term “Software Project Team Evolution”. (5)
- (C) Explain the basic fields of Software Change Order with the help of a template of the same. (5)
- (D) “Project software standard is to be set by organization policy.” Explain the statement. (5)

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain the three Management Indicators’ Metrics in detail. (5)
- (B) Write a short note on Pragmatic Software Metrics. (5)
- (C) Explain the two dimensions of process discriminate with neat diagram. (5)
- (D) Enlist the factors of tailoring a software process framework. Explain the scale factor in detail. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain the term “Next Generation Software Economics”. (5)
- (B) Explain the steps or strategies to make Error-Free Software. (5)
- (C) Write an exhaustive note on “Culture Shift”. (5)
- (D) Explain how Modern Process Transition claims to be Fruitful. (5)

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**[CBSGS – 60:40 PATTERN]
(APRIL – 2014)**

PAPER - IV

ELECTIVE

**GEOGRAPHIC
INFORMATION
SYSTEM**

Time: 2 ½ Hours

Total Marks: 60

N.B.: (1) All Question are Compulsory.

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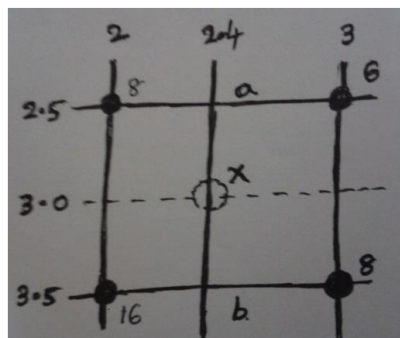
(6) Use of Non – Programmable Calculator is allowed.

Q.1 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is GIS? What are the different applications of GIS? (5)
- (B) What is Map Projection? What are the commonly used Map Projections? (5)
- (C) Describe projected coordinated system and also explain what Conversion between Data is? (5)
- (D) How is Data Structure represented in Geo-Database Data Model? (5)

Q.2 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Write Short Notes On: (5)
- (i) U.S. geological Survey
- (ii) Federal Geographic data Committee
- (B) How to create geospatial data? Explain any two methods. (5)
- (C) Explain affine transformation. (5)
- (D) What is bilinear interpolation? Using bilinear interpolation method find the value of x in the following figure: (5)

**Q.3 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)**

- (A) How are the attributes of Geospatial Data represented and how is it managed? (5)
- (B) Explain the Colour Schemes and its use in Maps. (5)
- (C) Describe the types of relationships that exist between the Relational Data. (5)
- (D) Write a short note on Typography and its type variations. (5)

Q.4 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) How Descriptive Statistics is used in Data Exploration? Also state any two types of Graphs used for Data Representation and Analysis. (5)
- (B) What is Spatial Data Query? What are the various methods of feature selection? (5)
- (C) Describe Query by Cell Value with an example. (5)
- (D) How Map Comparison can be used for Data Exploration? (5)

[TURN OVER]

Q.5 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) Explain Buffering and how it is helpful in Vector Analysis. (5)
- (B) What is Overlay? How are slivers related with Overlays? (5)
- (C) Explain Neighbourhood Operation in Raster Analysis and calculate the same for the following data: (5)

1	2	3	3	2
2	1	3	2	3
1	3	2	3	1
2	2	2	1	1
3	1	3	3	2

- (D) Differentiate between physical distance and cost distance. (5)

Q.6 ATTEMPT ANY TWO QUESTIONS: (10 MARKS)

- (A) What is Spatial Interpolation? What are the different types of Spatial Interpolation? (5)
- (B) Find the unknown value at 0 with the known values given as below: (5)

Point	X	Y	Value
1	20	25	12
2	15	20	15
3	18	20	16
4	14	16	10
0	15	18	?

- (C) What are Thiessen Polygons? Give an example. (5)
- (D) Explain the use of Thin Plate Splines. (5)